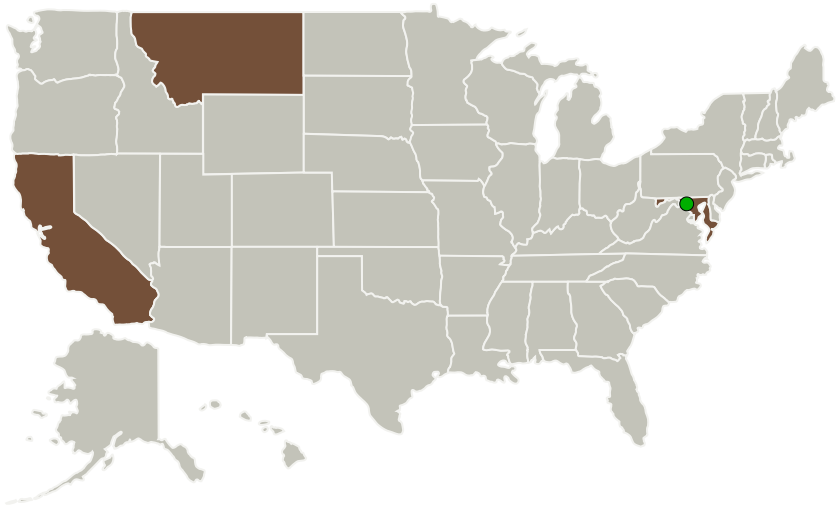
# A Compact, Waveguide Based Programmable Optical Comb Generator, Phase I

Completed Technology Project (2010 - 2011)

## Project Introduction

This NASA Phase I STTR effort will establish the feasibility of developing a compact broadband near to mid-IR programmable optical comb for use in laser based remote sensing and communications. The comb generator will use a waveguide-based optical parametric gain block technology that can have ultra wideband (>250nm) operation with very high gain (>25dB) in a very compact footprint. This approach is enabled by advances both in waveguide processing and in substrate growth, which allows for fabrication of complex waveguide structures to be formed in commercially available large-diameter nonlinear optical substrates. Optical comb sources are increasing the achievable sensitivity and system performance for a range of applications including gas sensing, optical communications, frequency metrology, precision spectroscopy and optical coherence tomography and thus directly addresses NASA's mission to advance remote sensing measurements to improve the scientific understanding of the Earth specified in 2009 STTR call: T4.01 Lidar, Radar and Passive Microwave.

## Primary U.S. Work Locations and Key Partners

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## Table of Contents

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| Organizations Performing Work | Role | Type | Location |
|---|---|---|---|
| ADVR, Inc. | Lead Organization | Industry | Bozeman, Montana |
| Goddard Space Flight Center(GSFC) | Supporting Organization | NASA Center | Greenbelt, Maryland |
| Stanford University(Stanford) | Supporting Organization | Academia | Stanford, California |

| Primary U.S. Work Locations | |
|---|---|
| California | Maryland |
| Montana | |

## Project Transitions

**January 2010:** Project Start

**January 2011:** Closed out

**Closeout Documentation:**

- Final Summary Chart*(https://techport.nasa.gov/file/140654)*

## Organizational Responsibility

**Responsible Mission Directorate:**

Space Technology Mission Directorate (STMD)

**Lead Organization:**

ADVR, Inc.

**Responsible Program:**

Small Business Innovation Research/Small Business Tech Transfer

## Project Management

**Program Director:**

Jason L Kessler

**Program Manager:**

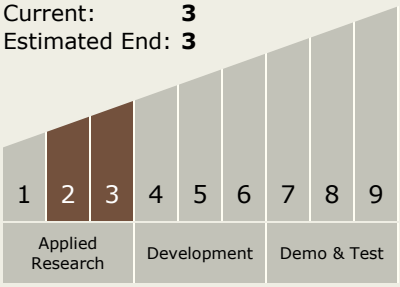
Carlos Torrez

**Principal Investigator:**

Elizabeth J Heckel

## Technology Maturity (TRL)

Start: **2**
Current: **3**
Estimated End: **3**



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## Technology Areas

**Primary:**

- TX05 Communications, Navigation, and Orbital Debris Tracking and Characterization Systems
  - TX05.1 Optical Communications
    - TX05.1.6 Optimetrics

## Target Destinations

Earth, The Moon, Others Inside the Solar System, Outside the Solar System, The Sun, Mars